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An Exploration of Aesthetic and Technical Possibilities Through the Combination of Several Media in the Designing of Three Dimensional Sculptural Forms

Donald C. Sheppard
Central Washington University

AN EXPLORATION OF AESTHETIC AND TECHNICAL POSSIBILITIES THROUGH THE COMBINATION OF SEVERAL MEDIA IN THE DESIGNING OF THREE DIMENSIONAL SCULPTURAL FORMS

A Thesis

Presented to

the Graduate Faculty

Central Washington State College

In Partial Fulfillment

of the Requirements for the Degree

Master of Education

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THERM DECAY AS A CULTURAL FORCE

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APPROVED FOR THE GRADUATE FACULTY

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Frank Bach, COMMITTEE CHAIRMAN

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Ramona Solberg

_____

Eldon E. Jacobsen

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CHAPTER I

THE PROBLEM

Statement of the problem. It was the intent of this study to create a series of three sculptural forms employing combinations of materials such as metals, woods, and clay. A careful procedural description comprises the documentary portion of this study. Inherent in this primary intent, of course, were the problems of (1) combining the materials used in each piece into an aesthetically integrated sculptural form and (2) experimentation with techniques for structurally unifying the materials.

CHAPTER II

DESIGN OF THE STUDY

Production of the sculptural forms. A series of three sculptural forms were created for the study. Each of these employed in their structure a combination of two media. In creating these pieces an attempt was made to achieve a visual unity whereby one material would not be merely ornamental or superficial but an integral part of the design.

In designing the sculptures a good deal of preparation, in the nature of drawings and sketches, was necessary. Also in the preliminary work, various materials were considered in order to avoid weaknesses in construction and to avoid direct repetition of other work the sculptor has done.

It would be presumptuous to believe that totally new uses of materials in sculptural forms could be achieved in so few pieces. It should be acknowledged then, that the sculptor has used many ideas that are developments of previous experience and that the influence of other sculptors is no doubt present.

Finally, since the sculptor's work in the study was experimental, a verbal and pictorial report has been made for presenting the experiments.

CHAPTER III

ANALYSIS OF THE STUDY

Each of the sculptural forms created for the study required preparation through sketches and drawings. Because of the academic nature of this phase of the work, however, the sculptor believed that it would be unnecessary to include the drawings and sketches in the paper.

Throughout the analysis it will be noted that each sculpture is considered separately and chronologically.

I.

The first sculpture created for the study was a pair of door pulls. They were done as a commission for a home near Tacoma, Washington.

In designing this piece, three requirements became apparent. The sculpture would need, besides a form combining two media, a form that would be aesthetically integrated with the architecture of the house and yet serve as a center of interest on the doors, and a design that would be functional.

Walnut and sheet copper were the final selections as materials for the sculpture. Since both materials are durable, and are related in color, they seemed appropriate. Also, because walnut stained wood was predominant on the doors and in other parts of the house, it seemed that the visual integration of the forms would be strengthened.

It was also felt that the aesthetic continuity between the form of the door pulls and the architecture could be aided through their size relationship. Thus, by designing the door pulls to be about one third the heighth of the doors, it appeared that they would not become visually isolated.

Their relatively large size, it seemed, would also aid in their use.

By being made to the above proportions it was presumed that the door pulls would be obvious to approaching visitors and would be heavy enough to operate the latching mechanism. The latching mechanism was not part of the sculpture but was considered in so far as it affected the design. To operate the latch, for example, the door pulls had to turn on a vertical axis. To provide for this, a hinge was designed for the backs of the pieces. A curved back on the pieces was also incorporated in the design so they could be turned as much as necessary without having to place them too far from the doors. The curved back, it appeared, would also make the forms more comfortable to grasp.

In further regard to the use of the door pulls, some tactile factors were considered. Smooth wood, for example, seemed appropriate on the areas that would be contacted. In contrast, fairly rough textures were planned for the metal pieces. It was thought that this contrast in textures might help to indicate the correct pulling position on the forms. By referring to Figure 4 it might be seen that a person would likely pull on the larger smooth wood area of the forms, which would most easily activate the latch.

In carrying out the final design the walnut forms were made first. Both pieces were made from a single, two inch by seven inch plank. They were both cut to a length of thirty-five inches. The areas to be carved were next drawn on both pieces. In doing this a paper template was used so that the forms would match. The carving of the recessed areas was executed with common wood sculpting tools. (Various gouges and a carving mallet). (Figure 1, page 5). Sandpaper was used to smooth the concave areas after the carving was completed.

A different technique was used to shape the remaining areas of the forms. The convex surfaces on the front and the

FIGURE 1

THE ESSENTIAL FORM OF THE WALNUT PIECES FOR THE DOOR PULLS HAVE BEEN ROUGHED OUT AND THE RECESSED AREAS ARE BEING CARVED

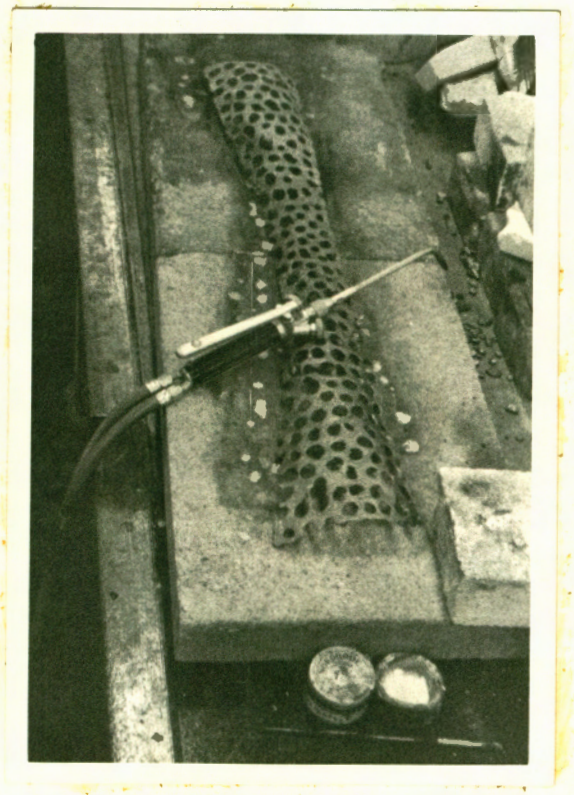

FIGURE 2

THE ARRANGEMENT USED IN FUSING THE COPPER FORMS AND THE TORCH USED IN THE FUSING PROCESS

back were rough formed with a band saw. A hand plane, rasps, and sandpaper were then used in finishing. Slots for the steel hinges were carved on the back of both pieces and the wood was impregnated with an oil finish. At this point the pieces needed only the addition of the copper forms and the hinges.

In the initial idea for this sculpture a rough textured metal form was envisioned. Various techniques for attaining textures on metals were explored. Experimentation with fusing sheet copper, however, led to the forms that were used in the sculpture. Since these forms were to occupy the concave area on the front of the walnut pieces a sheet of eighteen gauge copper was cut to conform to their outline. The copper sheets were then placed face down on a slab of fire brick. An oxy-acetylene torch was used to attain the necessary fusing heat and the eventual changes of form and texture. (Figure 2, page 6).

The edges of the copper sheets were fused first then followed by the inner areas. Throughout the fusing process an attempt was made to capitalize on the metal's fusing characteristics. For example, since copper tends to ball-up, (because of the capillary attraction) by fusing small areas at a time, the melting metal developed ridges and drip like formations on the underside. Holes were also formed in the copper during the fusing process. An attempt was made to vary the hole size so that the dripped forms that developed under the metal would also vary in size and shape. It was also necessary to limit the fusing of the holes so that enough of the original sheet form remained to hold the metal in one piece. The effect of the overall fusing and dripping of the copper was a three dimensional surface that offered both interest and a pleasing tactile quality.

Following the fusing process the copper forms were cleaned and then beaten into the concave areas on the walnut

pieces. This made the copper fit the wood and also made it recessed so as not to snag clothing. After fitting the copper forms, three pins were made for the back of each piece. These were made of one-fourth inch copper rod and were brazed to the backs to function as rivets for attaching the metal to the wood. An overall patina, using liver of sulphur, was then applied to the copper. This was cleaned off on the high spots with steel wool so that only the recessed areas remained black. Holes were then drilled in the walnut forms and the finished copper pieces were driven into place. (Figure 3, page 9).

The only remaining task was to make hinges for hanging the forms. These were made from one-fourth inch strap iron. They were fastened in place with wood screws. Two eighteen inch pieces of three-eighths inch steel rod were used as pins for the hinges. All the ferrous metal pieces, except the pins, were painted with a primer and a flat black enamel. The pins were coated with oil. In both cases the coating was applied to retard oxidation. The completed door pulls were ultimately mounted on the doors by the sculptor. (Figure 4, page 10).

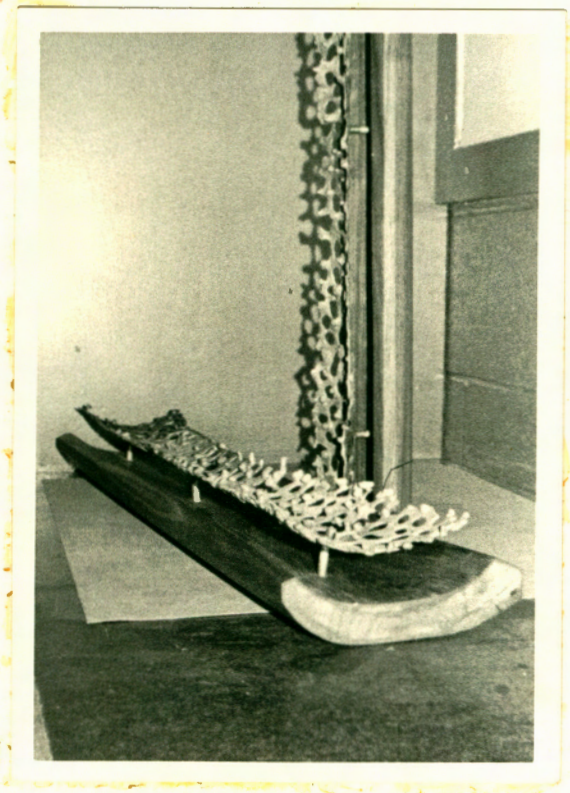

FIGURE 3

BOTH DOOR PULLS AS SEEN FROM DIFFERENT ANGLES
WITH THE COPPER FORMS READY TO BE
DRIVEN INTO PLACE

FIGURE 4

THE DOOR PULLS AS THEY APPEARED AFTER BEING MOUNTED ON THE DOORS

II.

The second sculpture created in the study was a purely aesthetic form. It was titled " The Musician ". The conception of this sculpture was partially a result of experimentation with forms having similar material combinations and techniques. In this respect it is hoped that the work is reflective of these efforts. On the other hand an attempt has been made to go beyond refinement of technique in developing a unique sculptural form.

The media chosen for " The Musician " was a combination of teak wood and welded steel. These materials were chosen for their durability, color, and workability. The fact that the materials contrast in all these aspects made the problem of combining them in a sculptural unit, a challenge. Unlike the door pulls, " The Musician " required no functional considerations beyond those that would make the form structurally sound.

In producing this sculpture the teak body was formed first. (Figure 5, page 12). It was cut from a plank and rough formed with a band saw. The final forming was completed with rasps, knives, gouges, and sandpaper. It was not oiled, however, until after the steel legs were attached.

The arms and legs of the form were constructed separately, using steel welding rod. An oxy-acetylene torch was used to weld the rods into the needed forms. The legs were begun first. (Figure 6, page 12). To align them with the teak torso two three eighths inch rods were inserted into the base of the torso where holes had been drilled to accept them.

FIGURE 5

THE TEAK TORSO AFTER BEING FORMED AND FINISHED EXCEPT FOR THE OIL FINISH

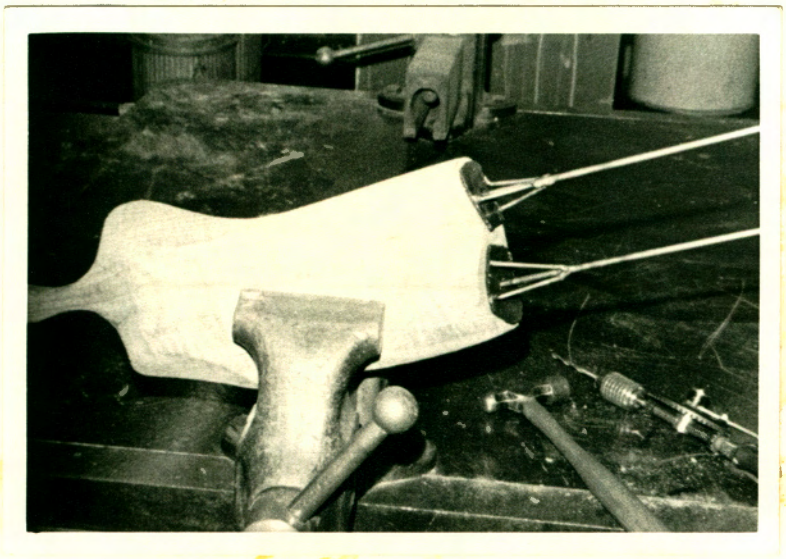

FIGURE 6

FITTING THE STEEL LEGS TO THE TORSO

The rods were then bent to approximate the position the legs required. Next the leg rods were joined together by a third rod about two inches down from the torso to help hold the legs in position when removed for welding. After this, two one-fourth inch thick steel plates were cut and forged, to fit the base of the torso where the steel rods were pushed in. These plates had holes cut in them so that the rods could be attached and thus form a solid close fitting joint between the wood and the steel. The rods were pulled out of the wood to weld the plates to them. This was to prevent the wood from burning. To complete the legs the rods were inserted into the torso only part way. This enabled the sculptor to weld without igniting the wood. A temporary base was also used in this phase so the sculpture could be held vertical. In welding the leg forms, one-eighth inch steel rods were employed. They were butt welded onto the steel plate at first and then end to end as the form developed. They were also welded together along their entire length so that a solid surface resulted.

The arms of the figure were fashioned much the same as the legs. Basic skeletal rods were bent to establish the desired position. Steel plates were then attached at the shoulder joints and thinner rod was used to build up the remaining form. A slightly different technique was used, however, in attaching the arms. While the legs were glued and then rammed into place when completed, a fairly deep socket was first carved in the torso to accept the base of each arm. (Figure 7, page 14). The sockets served two purposes. They helped hold the arms stationary and also helped to visually integrate the metal forms with the wood. Besides the arms and the legs, another form, one suggesting a musical instrument, was forged in steel and then brazed to the main structure.

In finishing the sculpture a permanent base was attached and an oil finish was applied to the steel and wood. (Figure 8, page 14).

FIGURE 7

A VIEW SHOWING THE PLACEMENT OF THE ARMS

FIGURE 8

THE FINISHED SCULPTURE ON ITS PERMANENT BASE

III.

Combining earthenware clay and steel forms became the third and final sculpture created in the study. This sculpture, like " The Musician ", was not conceived with any particular function in mind. It was, however, made of materials that would allow it to be placed outside and so this might be regarded as one aspect of its use. Beyond this, the design of the form had only technical and structural limitations.

The construction of the sculpture involved first, a vertical arrangement of five wheel thrown clay forms, and second, an interior structure of several sheet steel shapes. The differences in color and texture between the materials seemed to suggest that a repetition of form would be essential to integrate the design. It was for this reason that a vertical column of cylindrical forms was developed.

In producing the sculpture the clay forms were made first. A heavily grogged, red earthenware clay was used. Because of the cylindrical design, the pieces were wheel thrown. (Figure 9, page 16). Also, since the separate pieces had to interlock to give stability to the whole form, this technique satisfied the structural needs with relative ease. All the pieces were thrown in one sitting. This was done so that they could be measured to fit each other before shrinking. Each of the earthenware forms were made between six and seven inches tall so that the ceramic part of the sculpture would measure about thirty-five inches in height. The wall thickness of the pieces, to provide sufficient strength, averaged about three-eighths of an inch.

While the clay was still quite damp, the open spaces in the forms were cut out. (Figure 10, page 17). This was done with a needle and potter's knife. These openings were the ones through which the steel forms would be seen. Also

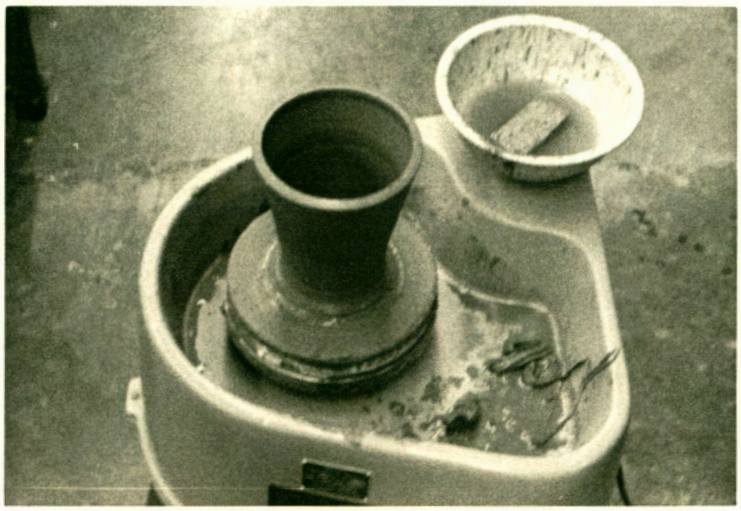

FIGURE 9

THE EARTHENWARE FORMS ARE THROWN
ON THE POTTER'S WHEEL

FIGURE 10

WHILE THE CLAY WAS DAMP THE OPEN SPACES WERE MADE IN THE EARTHENWARE FORMS

in the damp stage, a coil built lip was applied to the outside of each opening. (Figure 11, page 19). It was felt that this would help relate the inner and outer surfaces of the forms.

Eventually the pieces were dry enough to trim. The trimming was done in such a manner that each succeeding form would fit the one beneath. (Figure 12, page 20). In doing this a short indented foot was made on the base of each piece. All but the top and bottom forms were made bottomless so that an unbroken steel form could be used inside. The trimming completed the basic forming of the clay pieces. A texture, composed of thin vertical grooves was added, and the pieces were allowed to dry.

After the clay forms had been fired, the sculptor began to produce the steel forms. In the center of the structure, as indicated earlier, there was to be a steel rod which would support the sculpture. The central rod also provided a base upon which the steel forms could be brazed. The rod was made partially of one-half inch round rod and the remainder of one-fourth inch round rod. The rod section to be passed through the bottom clay piece was one-half inch in diameter and was made long enough to allow for its insertion into a wooden base. A three inch diameter steel washer was made to fit inside the foot of the bottom clay form. The section of rod beyond the base of the first clay piece was made of one-fourth inch diameter rod so that an extreme heat could be avoided in brazing on the other steel forms. After the rod was completed the sheet forms were made. They were cut from one-eighth inch sheet steel, using the cutting attachment on an oxy-acetylene torch. (Figure 13, page 21). The torch was employed again for brazing the sheet steel forms to the central rod.

The details of the brazing operation became quite involved due to the difficulties in making the sculpture a structural unit. First the bottom clay form was positioned over the rod. Next the sheet steel forms for this section were

FIGURE 11

A COIL BUILT LIP IS ADDED TO THE
EDGE OF THE OPENINGS IN
THE CLAY FORMS

FIGURE 12

A LIP IS TRIMMED ON THE BOTTOM OF EACH PIECE SO THAT THEY WILL FIT INTO ONE ANOTHER

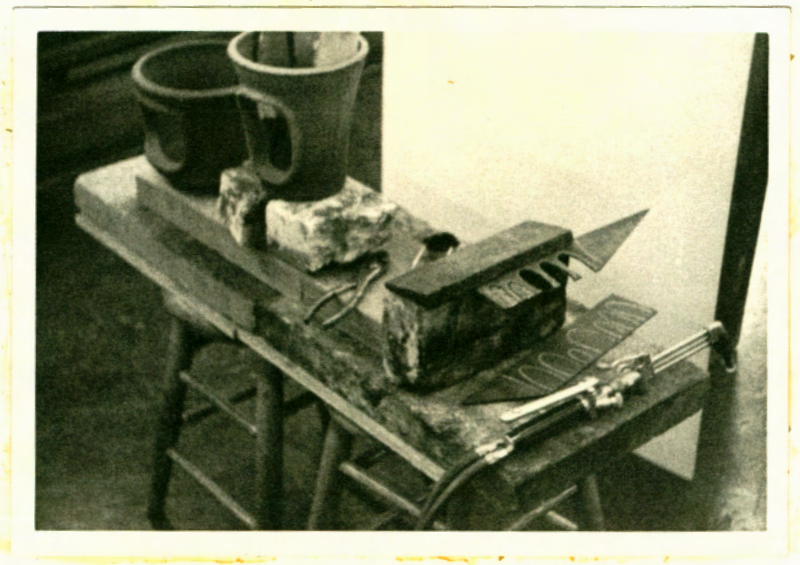

FIGURE 13

THE SHEET STEEL SHAPES ARE CUT WITH THE CUTTING ATTACHMENT ON THE OXY-ACETYLENE TORCH

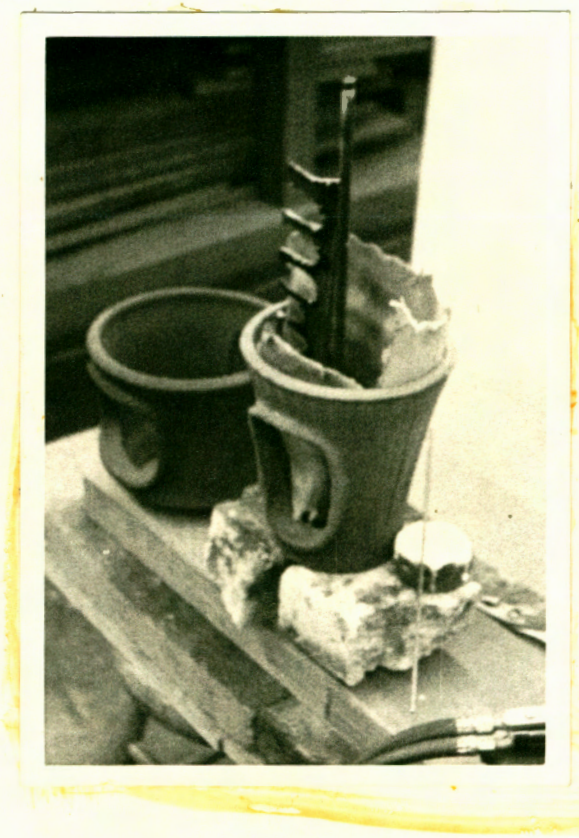

FIGURE 14

IN PREPARATION FOR BRAZING THE SHEET STEEL
TO THE ROD, ASBESTOS LINING IS USED
TO PROTECT THE CLAY FORMS

brazed into place on the rod. An attempt was made here to keep the steel pieces arranged in symetrically radiating positions. At the same time the clay had to be protected from the extreme heat of the torch. The heat could possible cause the clay to crack. To manage this the sculptor inserted sheets of asbestos between the clay and the area being heated. (Figure 14, page 22). The asbestos was apparently successful but was inconvenient to work around. Above the first earthenware piece the asbestos lining was not necessary because the flame from the torch did not hit the clay. When the clay forms were stacked up and the top piece was positioned, however, the use of asbestos lining was again necessary. This was because the top clay form had a solid base and the sheet steel forms could not possibly be brazed on until the last clay form was in the place.

In completing the sculpture, the joints between all the clay forms were cemented, with pure Portland cement, and a permanent base, made of mahogany, was attached. (Figure 15, page 23).

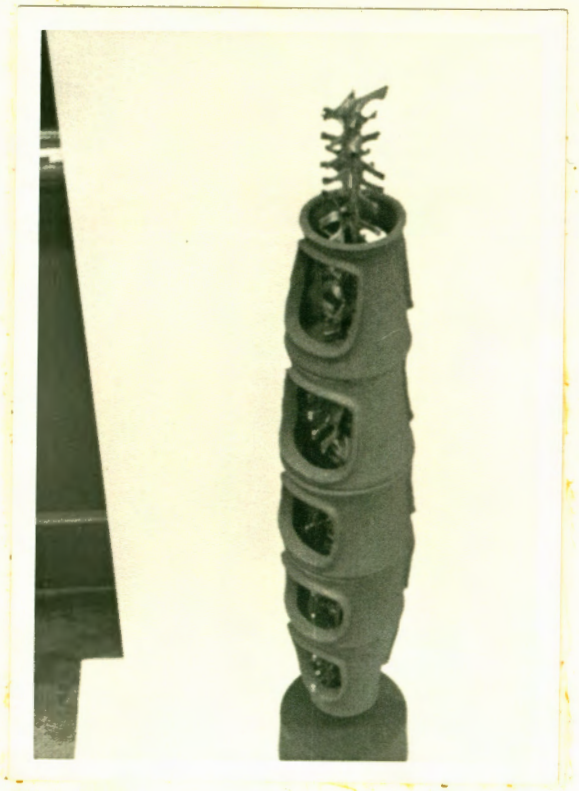

FIGURE 15
THE COMPLETED COLUMN

CHAPTER IV

CONCLUSIONS

A critique of the study. Certainly none of the pieces of sculpture produced in the study presents a final solution to the problem of combining various materials in sculptural forms. It is hoped, however, that the works do show valid efforts, aesthetically and technically conceived, and will suggest other materials and their successful combination in the creation of sculptural forms.

I.

In examining the aesthetic aspects of the door pulls it should be noted that because of their function, the form of the sculpture was limited, particularly regarding size and weight. Had the form, for example, been so small as to be inconspicuous, or so large as to be unwieldy, the effect might have been ludicrous. The function of the pieces also demanded a limitation in the depth of the form. A form standing out too far from the door would have been impractical. On the other hand an effort was made to create as much three dimensional form as possible. The integration of the two materials, copper and walnut, aided this effort. It made possible the use of the fused copper forms, for example, and also allowed interesting spacial areas between the materials.

A greater three dimensional effect could have been created perhaps, by building up the fused forms more and maybe by providing more space between the two materials. In observing the walnut part of the forms it was also noted that even though the front and back surfaces are curved, they could have been more deeply formed, to enhance the three dimensional qualities, without hindering the usefulness of the pieces.

It seemed that the pieces integrated well with the architecture because of the color relationship and because of their rectangular shape which echoed the dominant forms of the house. (Figure 16). It appeared that this relationship of forms was satisfactory too because the door pulls were large enough to be a focal point and yet did not seem obtrusive. Their visual balance in the area seemed effective and aesthetically related to their architectural environment.

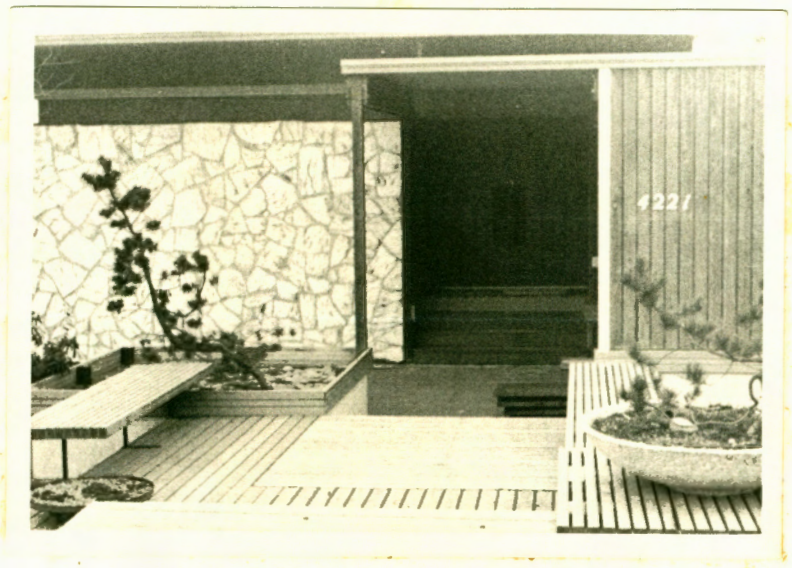

FIGURE 16

THE RECTANGULAR OUTLINE OF THE DOOR PULLS REPEATS THE GENERAL FORM USED IN THE ARCHITECTURE

II.

Since the problems involved in the creation of " The Musician " were purely aesthetic, the only limitations on form were those that were inherent in the materials. It is hoped that some of the sculptural possibilities of combining steel and wood are realized through the sculptor's treatment of these problems in this work.

An attempt was made to visually integrate the two media by first making them a structural unit. The use of a human figure helped to accomplish this because its form offered a visually logical placement of the arms and legs. The use of the musical instrument was also intended to fortify the structural unification. Thus the overall continuity of this sculpture, it seems, was enhanced by the structural unity.

The suggestion of movement in the form was also helped by combining the two materials. This is particularly evident in the arms and legs. (Figure 17, page 27). Although the wood torso is leaning slightly, the steel legs and arms tend to amplify this movement due to their arrangement and form. The advanced leg and the tapered forms give the illusion of movement. The arms convey the suggested motion of the figure too, as one arm is higher than the other and because they are joined at different axes on the torso. The varied thickness here also carries the illusion of motion. The horizontal placement of the arms is meant to interrupt the visual movement of the torso. This would have been less evident had the materials not contrasted in color and texture. It seems that the contrast in color and texture of the materials helps make the piece somewhat unique.

The use of somewhat detailed forms in the sculpture, as seen in the hands and the musical instrument, also provide a unique quality. Since these forms are variations of the main theme they help, in my opinion, to make the total composition more interesting. (See Figure 8, page 14).

FIGURE 17

THE SUGGESTION OF MOVEMENT IN THE FIGURE IS ENHANCED BY THE POSITION AND FORM OF THE ARMS AND LEGS

III.

Column, steel and clay. An attempt was made in creating the column, to achieve integration of two supposedly unrelated materials. By designing a nearly symetrical repetition of forms it was envisioned that the aesthetic demands of the sculpture would be met.

The structural unity of the sculpture is observable in both the earthenware clay forms and in the steel forms that support the piece. The earthenware forms are interlocking and are forced together by their own weight and by the interior steel structure. This repetitious interlocking system lends visual repetition to the forms and thus unifies the design. The steel forms too, are repeated inside the structure and reinforce the visual continuity. A further attempt to unify the design can be seen in the form relationship between the steel shapes and the open spaces in the clay forms. (Figure 18, page 29). A cylindrical base was also employed in an effort to echo the main theme.

Further continuity may be observed in the colors and textures of the sculpture. The texture on the clay pieces relates to the rough edges of the steel, and the iron cobalt stain used on the clay harmonizes with the steel's natural color. All these aspects of unity in the design seem to accomplish their end.

Variation in the design is obvious in color, form, and texture, but more variation might have made the sculpture less visually static. The earthenware forms, for example, could have been more varied in size. The spaces, through which the steel forms are seen, might also have varied in size. Moreover, a less repetitious spacing of the steel forms inside might have lent this part of the form more visual interest.

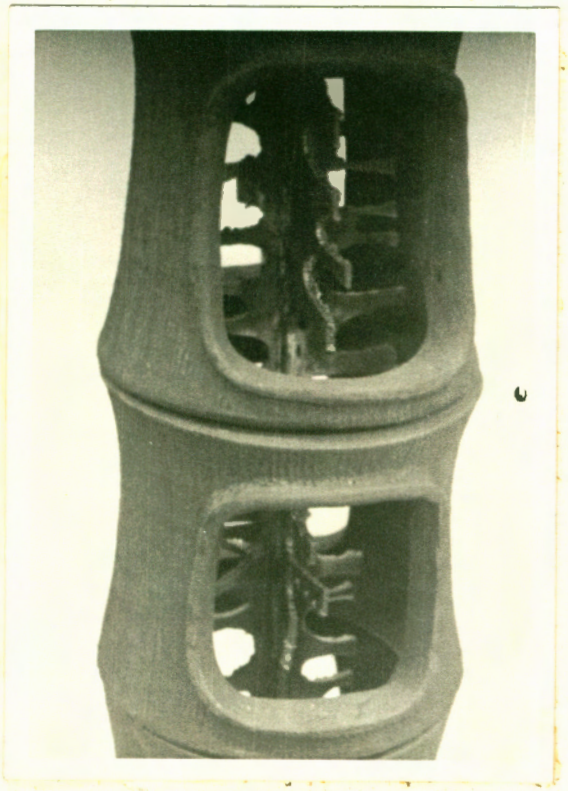

FIGURE 18

THE VISUAL RELATIONSHIPS IN FORM, SPACE, AND TEXTURE, ARE EVIDENT IN THE SCULPTURE

CHAPTER V

IMPLICATIONS FOR FURTHER STUDY

Even though the work done in the study was creative in nature it must be reacknowledged that it was a synthesis of earlier experiences. With this in mind the sculpture should appear also as a momentary sampling rather than as an achieved goal. It should be said too that a partial intent of the work was to suggest further experimentation. Although it would be impossible to foretell specifically where experimentation might lead, significant generalizations can be mentioned that might offer possibilities.

Considering, for example, the door pulls, one might see a point of departure for employing other woods and other metals. Other materials could be employed as well. Plexiglas, enameled metal, or ceramic forms might be appropriate if properly designed. The only requirement for a material used in this type of design would be resistance to moisture and temperature extremes, if used on an outside door. Beyond using other materials, other kinds of forms could doubtless be developed within the same media and techniques. The fused copper work particularly would lend itself to quite baroque forms, either for architectural, or purely sculptural treatment. The combination of media here might, in fact, borrow representational subject matter similar in concept to " The Musician ", depending on the sensitivity of the design. Copper might be more limited in form than steel because of its relative softness, which is increased by the heating. Steel does not present this problem but, on the other hand, lacks the warm color and the fusing characteristics of copper. Steel is also subject to oxidation. One possibility in circumventing the weakness of copper, so it could be used in more spatial forms, would be to provide the copper parts with

a steel skeleton or to puddle the copper onto the steel.

The welded steel and teak sculpture, " The Musician ", might also suggest further developments. The idea of employing the steel to make appendages on a figure, for example, might be extended to animal forms. The structural techniques used in attaching the two materials might also find uses beyond representational forms.

The approach of using the structural techniques, as a point of departure, might further extend itself when considering the clay and steel sculpture (the column). The structure of the column could be used, for example, in joining other media or in connecting the same materials while changing the form.

Moving further on, the development of other forms might easily suggest unique methods of uniting the materials. Human or animal forms, for instance, might be designed wherein steel legs and arms could be cemented into sockets in the clay body. More assymetrical forms might integrate parts suspended by steel wires or possibly the parts could be tied together with wire or leather. An imaginative sculptor would see many such possibilities for creating sculpture in these media.

Moreover, it would seem, any sculptural design involving two or more materials offers many aesthetic possibilities to the sculptor that would not be feasible in a single material. The possible variations in form, texture, and color, when more than one material is used, would appear to make further efforts in this area worthwhile.

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